

CLAIMS

What is claimed is:

- 1) A method for defining attributes of polygon border tiles, comprising:
 - decomposing a polygon into a plurality of segments;
 - decomposing the segments into a plurality of border tiles;
 - designating at least one edge for each border tile;
 - determining a spatial relationship between the designated edge of each border tile and the polygon; and
 - generating the attributes of the border tiles based on the spatial relationship between the designated edge of each border tile and the polygon.
- 2) The method of claim 1 wherein generating the attributes further comprises:
 - generating a first attribute if the designated edge of the border tile crosses the polygon;
 - generating a second attribute if the designated edge of the border tile is disposed completely within the polygon; and
 - generating a third attribute if the designated edge of the border tile is disposed completely outside the polygon.
- 3) The method of claim 2 wherein the first, second, and third attributes are different from each other.
- 4) The method of claim 1 wherein designating at least one edge for each border tile further comprises designating an eastern edge for each border tile.
- 5) The method of claim 1 wherein designating at least one edge for each border tile further comprises designating the same edge for each of the plurality of border tiles.

6) The method of claim 1 wherein determining a spatial relationship between the designated edge of each border tile and the polygon further comprises determining if the designated edge of a border tile is within an interior space of the polygon.

7) The method of claim 1 further comprising:

designating the segments as vectors that traverse in a clockwise direction around a border of the polygon;

determining an attribute of a border tile based on a proximity of one of the vectors to one of the edges of a border tile and based on a direction of the one of the vectors through the border tile.

8) The method of claim 1 further comprising decomposing multiple segments through a single border tile.

9) A computer-readable medium having computer-readable program code embodied therein for causing a computer system to perform:

defining a polygon having a border that is non-self-intersecting and formed of a plurality of segments on a grid of tiles;

defining, from the grid of tiles, a plurality of border tiles that intersect the segments; and

generating an attribute associated with at least one edge of a border tile, wherein the attribute is selected from the group consisting of: the at least one edge crossing a segment, the at least one edge disposed completely within the polygon, and the at least one edge disposed completely outside the polygon.

10) The computer-readable medium of claim 9 wherein the attribute can be modified on at least two different occasions for the same border tile.

11) The computer-readable medium of claim 9 wherein the attribute is set to a first condition and then re-evaluated and set to a second condition if multiple segments pass through the same border tile.

12) The computer-readable medium of claim 9 wherein the attribute is associated with an eastern edge of the border tile.

13) The computer-readable medium of claim 9 having computer-readable program code embodied therein for causing the computer system to further perform converting the polygon to a non-self-intersecting chain-code wherein at least one segment passes twice through the same border tile.

14) The computer-readable medium of claim 9 having computer-readable program code embodied therein for causing the computer system to further perform:

defining a y-axis through a border tile;

generating an attribute based on a proximity of a segment through the y-axis.

15) The computer-readable medium of claim 14 wherein generating an attribute further comprises comparing proximities of two different segments through the y-axis.

16) A computer system comprising:

a processor; and

memory having computer readable code executable by the processor for:

decomposing a polygon into plural segments on a grid of tiles;

identifying a first border tile having an edge, the first border tile intersecting at least one of the segments; and

identifying a spatial relationship between the edge and the polygon to define an attribute of the first border tile with respect to the polygon, the spatial relationship being one of: (1) the at least one segment crossing the edge, (2) the edge being located within the polygon, and (3) the edge being located outside the polygon.

17) The computer system of claim 16 wherein the plural segments are non-self-intersecting.

18) The computer system of claim 16 further comprising computer readable code executable by the processor for identifying a spatial relationship between a direction of the at least one segment through the first border tile to define an attribute of the first border tile.

19) The computer system of claim 16 further comprising computer readable code executable by the processor for defining a horizontal axis through the first border tile and identifying a spatial relationship between the at least one segment and the horizontal axis to define an attribute.

20) The method of claim 19 wherein the at least one segment crosses the horizontal axis to generate a first attribute and does not cross the horizontal axis to generate a second attribute different than the first attribute.